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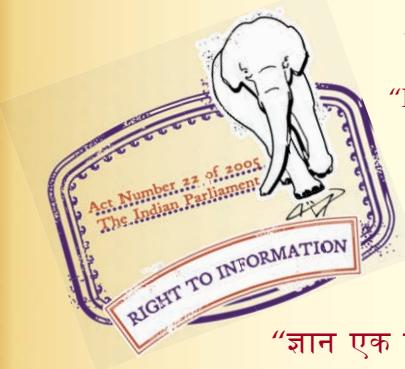
“Step Out From the Old to the New”

IS 4161 (1967): Nessler cylinders [CHD 10: Glassware]

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IS : 4161 - 1967

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*Indian Standard*  
**SPECIFICATION FOR  
NESSLER CYLINDERS**

UDC 542.3:531.73



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 1

Gr. 2

*August 1967*

**AMENDMENT NO. 2 JULY 2007  
TO  
IS 4161 : 1967 SPECIFICATION FOR  
NESSLER CYLINDERS**

(*Page 4, clause 4.5*) — Substitute the following for the existing clause:

**'4.5 Limit of Alkalinity** — When graded according to the method prescribed in IS 2303 (Part 1/Sec 1): 1994\*, it shall conform to Class HGB 1 of the glass.'

(*Page 4, footnote marked \**) — Substitute the following for the existing:

\*Grading glass for alkalinity : Part 1 Hydrolytic resistance, Section 1 Hydrolytic resistance of glass grains at 98°C - Method of test and classification (*first revision*).'

(*Page 4, clause 5.1.1*) — Substitute the following for the existing clause:

**'5.1.1 BIS Certification Mark**

The Nessler cylinders may also be marked with the Standard Mark.

**5.1.1.1** The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.'

(CHD 10)

**AMENDMENT NO. 1      NOVEMBER 1967**

**TO**

**IS : 4161-1967   SPECIFICATION FOR  
NESSLER CYLINDERS**

**Alterations**

( *Page 1, composition of CDC 33 : 1, left-hand column* ) — Substitute 'Convenor' for 'Chairman'.

( *Page 8, fifth line from top, right-hand column* ) — Substitute 'National Chemical Laboratory (CSIR), Poona' for 'National Physical Laboratory (CSIR), Poona'.

( *Page 8, advertisement text on Laboratory Glassware, under column IS:* ) — Substitute '915' for '1915'.

( CDC 33 )

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*Indian Standard*  
**SPECIFICATION FOR  
NESSLER CYLINDERS**

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National Physical Laboratory, New Delhi

*(Continued on page 8)*

**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 1

***Indian Standard***  
**SPECIFICATION FOR**  
**NESSLER CYLINDERS**

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 13 February 1967, after the draft finalized by the Laboratory Glassware and Related Apparatus Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard covers Nessler cylinders normally used in scientific and industrial laboratories. Nessler cylinders are suitable for use in laboratories for comparing the colour of lightly coloured liquids.

**0.3** In the preparation of this standard, assistance has been derived from B.S. 612 : 1952 'Nessler cylinders'.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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**1. SCOPE**

**1.1** This standard prescribes the requirements and methods of test for Nessler cylinders used in laboratories for comparing the colour of light coloured liquids.

**2. TERMINOLOGY**

**2.1** For the purpose of this standard, the definitions given in IS : 1382-1961†, in addition to the following, shall apply.

**2.1.1 Capacity** — The volume of water at 27°C in millilitres contained in the cylinder at 27°C when filled to the graduation line indicating nominal capacity, the lowest point of the meniscus being in the horizontal plane conforming to the top edge of the graduation line, with the cylinder in a vertical position.

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\*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to glass industry.

### 3. NOMINAL CAPACITY

**3.1** The Nessler cylinders shall be of the following two capacities:

- a) 50 ml, and
- b) 100 ml.

**3.2 Tolerance on Nominal Capacity** — The maximum error in capacity for 50 ml cylinder shall not exceed  $\pm 0.4$  ml. The maximum error in case of 100 ml cylinder shall not exceed  $\pm 0.8$  ml at either of the graduation lines and the difference between errors at the 50 ml and 100 ml lines shall not exceed 0.8 ml.

### 4. REQUIREMENTS

#### 4.1 Material and Workmanship

**4.1.1** The cylinders shall be made of transparent glass as free as possible from strains and visible defects. They shall be well annealed.

**4.1.2** The glass used shall be sufficiently free from colour to render it suitable for the colorimetric observations.

#### 4.2 Construction and Finish

**4.2.1** The cylinders shall be either mouth blown or made from glass tubing of as uniform a bore as possible. Each cylinder shall be finished at the top with a smooth fire-polished edge which may be strengthened by a slight beading, if desired. A small pouring lip shall be provided so that the liquid does not cling to the sides of the cylinder while pouring.

**4.2.2** The base of the cylinder shall be flat and polished on the outside and shall be such that the cylinder shall stand vertically on a level surface without rocking. On the inside, the junction between the walls and the base shall be such that the inside of the base is parallel to the outside over largest practicable area.

**4.2.3** When the cylinder is made from glass tubing the base shall either be formed from the tubing of which the body is made or shall be a glass disc permanently fused to the tube in a manner which precludes the possibility of liquid penetrating into the joint.

**4.3 Dimensions** — Nessler cylinders shall conform to the dimensions specified in Table 1.

NOTE — The tolerances on the heights to the graduation lines are adequate to allow for normal variations in manufacture. More stringent tolerances are not practicable. It is not possible, however, to use side by side Nessler cylinders differing from each other in height of graduation line by more than about 1 mm. Consequently in fulfilling any particular order, manufacturers or suppliers are expected to select from their stock, cylinders which agree satisfactorily with each other in height of graduation mark.

**TABLE 1 DIMENSIONS OF NESSLER CYLINDERS**  
(Clause 4.3)

SL No.	DETAILS	NOMINAL CAPACITY	
		50 ml (3) mm	100 ml (4) mm
(1)	(2)		
i)	Overall height	150 ± 2	180 ± 2
ii)	External height to 50 ml mark	117 ± 7	
iii)	External height to 100 ml mark		137 ± 8
iv)	Thickness of wall	1.0 to 1.5	1.2 to 1.8
v)	Thickness of base	1.5 to 3.0	1.5 to 3.0

#### 4.4 Graduation Lines and Numbering

**4.4.1** The cylinders of nominal capacity 50 ml shall have a graduation line corresponding to 50 ml and the cylinder of nominal capacity 100 ml shall have graduation lines corresponding to 50 ml and 100 ml.

**4.4.2** The graduation lines shall be clean permanent lines of uniform thickness not exceeding 0.3 mm lying in planes at right angles to the axis of the cylinder and horizontal when the cylinder is standing on a level surface. Each graduation line shall be carried completely round the cylinder and appropriately numbered as shown in Fig. 1.

**4.5 Limit of Alkalinity** — When graded according to the method prescribed in IS : 2303-1963\* it shall conform to Type 1 of the glass.

### 5. MARKING AND PACKING

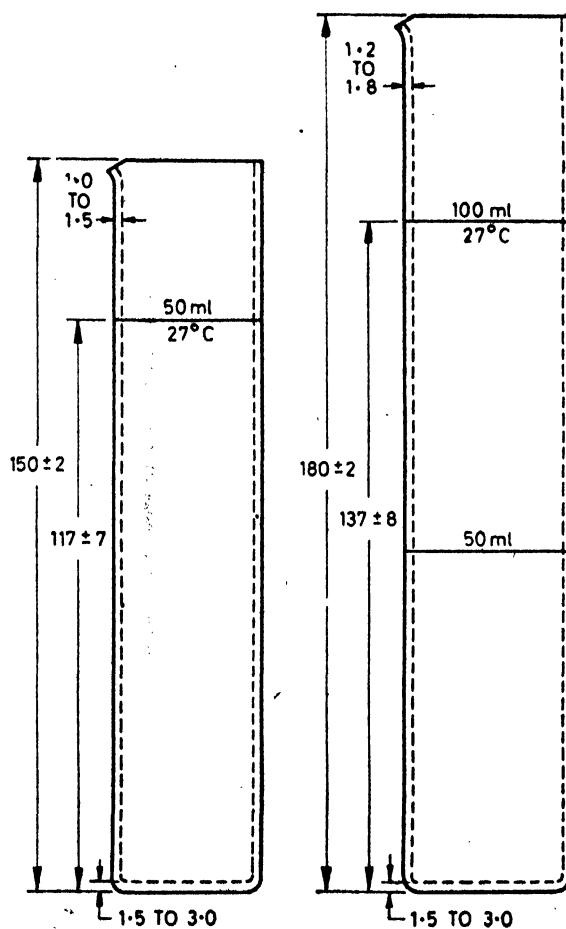
**5.1 Marking** — The following inscriptions shall be permanently and legibly marked on the Nessler cylinders:

- a) Nominal capacity followed by the abbreviation 'ml';
- b) The abbreviation '27°C' to indicate the standard temperature at which it is calibrated; and
- c) Maker's name or recognized trade-mark, if any.

**5.1.1** The Nessler cylinders may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

\*Method of grading glass for alkalinity.



All dimensions in millimetres.

FIG. 1 NESSLER CYLINDERS

**5.2 Packing**—Nessler cylinders shall be packed as agreed to between the purchaser and the supplier.

## 6. SAMPLING

**6.1** Representative samples of the material shall be drawn and adjudged as prescribed in Appendix A.

## A P P E N D I X   A

*(Clause 6.1)*

### SAMPLING OF NESSLER CYLINDERS

#### A-1. SCALE OF SAMPLING

**A-1.1 Lot** — In a single consignment all the Nessler cylinders coming from the same manufacturer and belonging to the same capacity shall constitute a lot.

**A-1.2** Samples shall be taken from each lot separately for ascertaining the conformity of the cylinders to the requirements of this specification.

**A-1.3 Test Samples** — When the lot contains more than 42 items, only 42 items shall be selected at random from the lot. These 42 items shall be the test samples. When, however, the lot contains 42 or less than 42 items, all the items in the lot shall be treated as test samples.

**A-1.3.1** In order to ensure randomness of selection of items from a lot, random number tables shall be used. In case the random number tables are not available, the following procedure may be adopted:

Starting from any item, count them as 1, 2, 3, etc, up to  $r$  and so on in one order; every  $r$ th item thus counted, shall be chosen where  $r$  is the integral part of  $N/42$ ,  $N$  being the total number of items in the lot.

#### A-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

**A-2.1 Alkalinity Test** — Take two items at random out of the test samples selected according to **A-1.3**. Subject them to the alkalinity test in accordance with **4.3**.

**A-2.1.1** If both the items pass the alkalinity test, the remaining test samples shall be subjected to further tests for all other requirements; otherwise the lot shall be rejected without further testing.

**A-2.2 Requirements Other than Alkalinity Test** — For this purpose the procedure shall be as given in the following clauses.

**A-2.2.1 Defective** — A test sample failing in one or more of these requirements shall be called defective.

**A-2.2.2** In case the test samples remaining after the alkalinity test are less than 40, all of them shall be tested for these requirements.

**A-2.2.2.1** If the samples tested for these requirements are 20 or less, no defective shall be permitted; if however, the number of items tested is between 21 and 39, one defective shall be permitted.

**A-2.2.3** In case the test samples remaining after the alkalinity test are 40, the procedure shall be according to **A-2.2.4** and Table 2.

**TABLE 2 CRITERION FOR CONFORMITY AT DIFFERENT STAGES IN TESTING**

STAGE (1)	SAMPLE SIZE (2)	Size (3)	CUMULATIVE SAMPLE		Acceptance No. (4)	Rejection No. (5)
			Size	Acceptance No.		
First	8	8	*			2
Second	8	16	0			2
Third	8	24	1			3
Fourth	8	32	2			4
Fifth	8	40	3			4

\*Acceptance not permitted at this stage.

**A-2.2.4 First Stage** — In the first stage take 8 items at random from the 40 test samples. Each of these 8 items shall be tested for these requirements. If the number of defectives is found to be equal to or to exceed the rejection number corresponding to the first stage in Table 2 ( that is, 2 ), reject the lot without further testing; otherwise proceed to the second stage.

**A-2.2.5 Second Stage** — In the second stage take another 8 items at random from the 40 test samples. Test them for these requirements and add the number of defectives to those found previously.

**A-2.2.5.1** If the total number of defectives in the cumulative sample ( 8 of the first stage + 8 of the second stage, that is, 16 ) is found to be equal to or less than the corresponding acceptance number given in Table 2 ( which is 0 for the second stage ), accept the lot; if it is equal to or greater than the corresponding rejection number given in Table 2 ( which is 2 for the second stage ), reject the lot; if it is between the acceptance number and the rejection number, proceed to the third stage.

**A-2.2.6 Third and Subsequent Stages** — The procedure for the third stage and subsequent stages, if any, shall be the same as for the second stage till a decision to accept or reject the lot is reached.

# IS : 4161 - 1967

(Continued from page 1)

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